Modern Electronic Metrology

Model 9330/9330A
Four-Terminal Standard Resistor
Data Sheet

GUILDLINE INSTRUMENTS

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NOTICE

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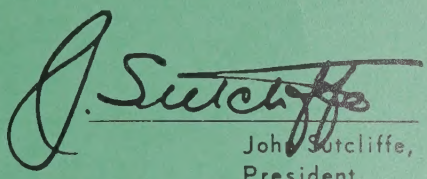
IMPORTANT

WARRANTY REGISTRATION

Thank you for expressing your confidence in Guildline Instruments by purchasing this instrument. It represents the result of meticulous craftmanship and advanced design techniques. Our continued existence depends on your satisfaction with our efforts and if for some reason this instrument should fall short of your expectations we wish to be the first to know.

In order to validate your warranty please complete the attached card. In return, we will place you on our mailing list for technical bulletins, announcements of new techniques and instrumentation, and other publications we feel will make your task easier.



John Sutcliffe,
President.

Should it become necessary to return this instrument to the factory, please first contact your local Guildline representative for instructions, or contact the factory directly. The instrument should be repacked in its original factory packing or in a sturdy container with a minimum of 3 inches, (approximately 8 cm) of resilient packing material on all sides. Rubberized horsehair or polystyrene foam are ideal materials. The instrument case should be protected from abrasion and the ingress of dust by wrapping in a sheet of vinyl or other plastic material.

WARRANTY REGISTRATION

Instrument Model_____ Serial Number_____ Date received_____

Firm Name:

Address:

Name of User:

Description of purpose for which instrument is employed:_____

_____

_____

_____

SIGNED:
TITLE:

GUILDLINE INSTRUMENTS

STATEMENT OF WARRANTY

WARRANTY

Guildline Instruments warrants its products to be free from defects in performance, workmanship and calibration. Any equipment which fails to meet its specification within 12 months from the date of receipt by the original purchaser will be repaired or replaced at no charge. This warranty does not apply to equipment which has been abused or if modifications or repairs have been made without the prior authorization of Guildline Instruments.

This warranty is extended for a further 12 months to a total of 24 months for those instruments and components which consist entirely of passive components.

Fuses, lamps and non-rechargeable batteries are not warranted. Glassware is not warranted against breakage.

Instruments should only be returned when authorized by Guildline or its accredited representative. Such request should state the nature of the malfunction. Shipping charges must be prepaid but will be refunded when examination of the returned merchandise confirms that it is warranty repair.

Warranty is confined to the original purchaser. No other warranty is expressed or implied and eligibility for warranty repair shall be determined by Guildline personnel.

Guildline shall under no circumstances be liable for consequential damage.

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2 WESTCHESTER PLAZA,

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GUILDLINE INSTRUMENTS, INC. 2 Westchester Plaza, Elmsford, N.Y. 10523

Modern Electronic Metrology

STANDARD RESISTOR

CERTIFICATE OF CALIBRATION

TYPE 9330 SERIAL NO. 42,704 NOMINAL VALUE 1K Ω

This resistor has been calibrated against resistance standards maintained in our plant standards laboratory, traceable to the National Research Council in Ottawa, Canada.

These standards are maintained by four terminal resistors with decade values between 0.0001 and 100,000 ohms. The resistors are immersed in oil controlled to a temperature of 25°C. Intercomparisons are made with a precision of ±0.0001% or better. Their values are compared with the national resistance standards at regular intervals with a precision of ±0.0001% or better.

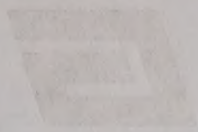
Deviation from nominal resistance -1 ppm. at 25°C X, 20°C -.
Temperature coefficient of resistance from 20°C to 30°C +1 ppm/C°.

The value of resistance given reflects the value of the Canadian legal standard of resistance effective January 1st, 1969, in accordance with resolutions passed at a meeting of the Comite International de Poids et Mesures, held in Paris on October 14-17, 1968, and to which Canada is a party. MIL-C-45662A establishes traceability of the Canadian legal standard of resistance to the United States legal standard of resistance.

DATE September 19, 1977

H. Bridenbrick

GUILDLINE INSTRUMENTS INC.



General Description

The design of the Series 9330/9330A hermetically sealed resistors began with a thorough reappraisal of existing designs with the intention of reducing, as much as possible, the causes of poor temperature coefficients, long time constants (due to slow self-heating) and large thermal emf. The investigation of these characteristics under widely differing power dissipation conditions was made possible by the use of a Guildline Model 9920 Direct Current Comparator Bridge (developed under the direction of N.L. Kusters of the National Research Council of Canada). The result of this program is a resistance element suspended in oil in a chrome-plated brass chamber with a cover plate of low leakage phenolic. This assembly is further protected by a second chrome-plated brass case. The connections to the resistance element are made in the familiar four-terminal configuration, with the potential terminals mounted on the cover plate and the current terminals on horns. All terminals are machined from solid, low-thermal copper to reduce thermal emf problems. Adjustable value units (9330A) are provided with a screw-driver adjustment which allows the user to change the resistor value by up to ±50 ppm. This adjustment is accessed through a small hole in the cover. The best resistor accuracy is obtained by immersing the unit in a constant temperature oil bath such as a Guildline Model 9730CR or 9732VT. The current terminals, which are spaced 75 mm apart on all units, should be used to support the resistor. Untinned, solid-copper wire (Guildline Type SCW) should be used for all connections to minimize thermal emf. Mercury cups are not necessary if the resistor is used with instruments such as a Guildline Model 9920 or 9975 DC Comparator Bridge or 9810L Comparator, since lead resistance is of no consequence.

Specifications

Accuracy	:	1-1000 Ω - ±0.0005 % 10 KΩ-100 KΩ - ±0.001 % 1 MΩ - ±0.002 %
Stability	:	±0.001 %/yr.
Temperature Coefficient	:	<2 ppm/C° from 25°-30°C
Power Coefficient	:	<2 ppm/W in flowing oil
Time Constant	:	<60 s to within 0.2 ppm of final value
Power Rating	:	0.1 W
Dimensions	:	5.1 cm (2 in) diameter 7.6 cm (3 in) height 7.5 cm (3 in) between horns
Weight	:	368 gm (13 oz)

Values Available

Model		Value
Fixed	Adjustable	Ω
9330/1	9330A/1	1
9330/10	9330A/10	10
9330/100	9330A/100	100
9330/1K	9330A/1K	1000
9330/10K	9330A/10K	10 000
9330/100K	9330A/100K	100 000
9330/1M	9330A/1M	1 000 000